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Fire & Plants

CONCEPT
Plant moisture levels follow a cyclical pattern in the Santa Monica Mountains. Fire managers monitor plant moisture levels to help fire fighters gauge the amount of staffing and equipment needed in the event of fire.

OBJECTIVE
Students will be able to
–describe the plant moisture levels of the Santa Monica Mountains using a graph
–identify moisture levels in a sampling of plants
–explain the importance of monitoring moisture levels in plants

METHOD
Have students work in groups to read through their handout, conduct the lab, and answer the questions on their investigation worksheet. You can conduct the lab as a demonstration, or have each group conduct it; you can have students collect samples from different plants and compare the results.

Procedure

1. Ask the students to read the *Fire & Plants* handout.

2. Have students complete Part A on the *6–Student Investigation Worksheet*.

Fuel Moisture Study Lab

This lab is designed to determine the fuel moisture level of plants. Freshly collected samples of foliage and twigs are weighed, dried in an oven for a specific period of time, then weighed again. The moisture content of the fuel sample can then be calculated, based on the weight measurements obtained before and after oven drying.

1. Label each paint can and lid and, using the balance, weigh both to the nearest 0.1 gram. (Gently use a paint can opener to remove the lid so the lid is not distorted.)

2. Record the weight under "C" on the *6–Student Investigation Worksheet*.

3. Using the pruning clippers, cut 2" to 3" long twigs and foliage (ideally of chamise, manzanita, and/or sage).
– take your samples from all directions on the plant
– clip from only the top 1/3 of the plant
– remove any dead portions of the twig

4. Place the twigs in the container, filling it 3/4's full.

5. Place the lid back on tightly. (If collecting samples in the field, away from school, place the cans in an ice chest filled with ice to prevent deterioration, and transport the containers to the classroom. Plan to conduct the lab no more than 3 hours from the time of cutting.)

6. Before leaving the collecting area:
– take the relative humidity of the area
– describe the cloud cover
– describe the condition of the plants used

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MATERIALS
–Student Handout
–Student Investigation Worksheet
–Laboratory drying oven
–Laboratory balance(s)
–Pruning clippers
–Sling psychrometer
–1 qt. metal paint can (per group)
–1 paint can opener
–Ice chest/ice (field gathering)
–Marker

DURATION
2 class sessions

7. Record the results on the *6–Student Investigation Worksheet*.

8. In the lab, weigh the SEALED samples to the nearest 0.1 gram.

9. Record the weight under *"A" Gross Wet Weight*, on the *6–Student Investigation Worksheet*.

10. Heat the oven for one hour at 103 - 105° C. Remove the lids CAREFULLY and place them aside. Place the OPEN containers in the oven and dry samples for 15 HOURS.

11. SEAL ALL CONTAINERS IMMEDIATELY and allow them to cool to room temperature.

12. Weigh each container to the nearest 0.1 gram.

13. Record the weight under *"B" Gross Dry Weight* on the *6–Student Investigation Worksheet*

14. Calculate the following to obtain the moisture content of the samples.
– Subtract *"C" Empty Container Weight* from *"B" Gross Dry Weight*, and record it under *"D" Dry Fuel Weight*.
– Subtract *"B" Gross Dry Weight* from *"A" Gross Wet Weight*, and record it under *"E" Weight Loss*.
– Divide *"E" Weight Loss* by its *"D" Dry Weight*, and using the quotient, multiply it by 100. Record the result under *"F" Percent Moisture*.

15. Have students complete Part C on the *6–Student Investigation Worksheet*.

16. Have students present their answers.

17. Discuss the answers with the students:

Video Connections

Introduction to Fire Behavior – Part 2: Fuels

Key Words

Convection	Density	Dormant
Dormancy	Fertility	Germinate
Predestined	Species	